A CONTRIBUTION TO THE STUDY OF THE TREATMENT OF APPENDICITIS, WITH A TABULATION OF FOUR HUNDRED AND FORTY-EIGHT CASES, INCLUDING SEVEN CASES OF THE WRITER'S.

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UNDER what circumstances is surgical interference justifiable and proper? It goes without saying that recourse should be had to the knife in cases manifesting signs of perforation, gangrene, or suppuration, in cases of frequent recurrence, and in cases where pain and tenderness continue, accompanied or not by a tumor. But shall we operate in "all cases of catarrhal and ulcerative appendicitis . . . as soon as the lesion is recognized?"[1] Or shall we follow the advice of Wier,[2] and delay operation in the milder cases of short duration "until it is indubitably proven that the invalidism is a confirmed one." Norman Bridge says: "Surgery is justifiable in all cases of undoubted chronic appendicitis, with occasional exacerbations, even if no induration is present."[3]

In studying the reports of cases for the purpose of arriving at an answer to these questions, we must conclude what symptoms, signs, and history are necessary for the diagnosis of appendicitis. Joseph Price says: "Cases of appendicitis that get well without evidence of severe lesion are always open to the doubt of being appendicitis at all."[4] I cannot subscribe to this view. There seems, reasoning from analogy and from the general principles of pathology, no sufficient proof to establish this doctrine. It is also not in accord with the opinion accepted by the majority of the best surgeons of to-day. Fitz, as quoted by Dennis in his masterly article in the *Medical News*, vol. lxi. p. 698, places recurrence at 11 per cent. If Price's view were adopted, then but few, perhaps, would be found objecting to Senn's advice above given. But if the well-known signs and symptoms, as usually given without a history of recurrence, are considered a sufficient basis for the diagnosis of appendicitis, then there seems reason for hesitating before acting upon it. In this connection it is pertinent to note those cases of localized ulceration of the cæcum which may be mistaken for appendicitis. Aside from the cases noted in Dennis's article, already referred to, Dr. Sutton, of Allegheny, reports a case to me by letter, in which there was perforation of both cæcum and ileum, requiring resection. Dr. Bridge, in his article above cited, also describes a case which proves that all the symptoms of appendicitis, including recurrence and tumor, may be present without either abscess or appendicitis.

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[1] N. Senn: Journal of the American Medical Association, November 2, 1889.

[2] Annals of Surgery, May, 1891.

[3] Medical News, vol. lvi. p. 553.

[4] Annals of Surgery, May, 1891.

Of the seventy-seven cases[1] in the appended table in which it is known that operation was not deemed advisable, there were no deaths, and while they have not all been followed for any definite length of time, yet no recurrences are known to have taken place. By reference to the table it will be seen that many of this number are known to have remained free from trouble from one to six months and longer.

Dr. Fitz, as quoted by Joseph Price,[2] places recurrence at 44 per cent. in his paper written in 1890; while Kroft, quoted also by Price, puts it at 22 per cent.

Taking all the facts as given on the subject of recurrence, we must conclude that the large majority of cases are solitary, though we are not warranted in making a positive statement as to the exact percentage.

It is not known how many of these recurring cases of appendicitis terminate in resolution; but as Dennis says: "Nearly all authorities, however, are in accord with the general statement that a majority of the cases undergo resolution, and that only exceptionally perforation occurs."[3]

Senn,[4] Morris,[5] and Joseph Price[6] regard the mortality of removal of the appendix as practically *nil* in uncomplicated cases. Morris, in a letter to the writer under date of April 22, 1893, says he has had "thirty-one cases of appendicitis in various stages of the disease, but without abscess, and all of these have made excellent recoveries after operation (two recent ones still in bed)." But how are we to tell before operation in all cases whether they are complicated or not? Is it not highly probable that there will often be found adhesions, which, while they enhance the danger of operation, render the likelihood of perforation or fatal peritonitis exceedingly improbable?

Of the fourteen cases of removal of the appendix during quiescence in the accompanying table, one died from sepsis. Occurring, as this death did, in the hands of a surgeon as well trained as Fenger, it must be given due regard. It seems warrantable to conclude, then, that *the danger of recurrence itself is not sufficient ground for operation.*

Well-defined tumors may disappear by absorption, the patient making a complete recovery.

[1] Fenger, 50; Hibbard, 3; Porter, 4; Griffith, 3; Saundby, 14; Link, 3.

[2] Annals of Surgery, May, 1891.

[3] Medical News, vol. lvi. p. 699.

[4] Journal of the American Medical Association, November 2, 1889.

[5] New England Medical Monthly, April, 1893.

[6] Annals of Surgery, May, 1891.

No tumor may be found, and yet large quantities of pus be present.

Presence of gas in an abscess may give a tympanitic resonance over a large collection of pus.

There may be no marked fulness, tenderness, or pain in cæcal region, and the operation prove the appendix perforated and the presence of pus and general peritonitis.

All the foregoing statements are proven by cases in the accompanying table. Hence, it may be said that the presence of a tumor is not of itself a sufficient warrant for operation, while it may be absent in cases clearly demanding one; that the absence of marked cæcal fulness, tenderness, and pain should not be deemed sufficient to bar operation; that tympanitic resonance, if other signs and symptoms demand it, should neither delay operation nor cause one to refuse to operate. The facts on which these conclusions are based, together with the case of Dana, in which the first symptoms were those of general peritonitis, and that of Winslow, in which there was absence of abdominal tenderness, with subnormal temperature, both cases dying on the third day,[1] serve to illustrate the difficulties of diagnosis which may arise, and emphasize the advice of Joseph Price to "resolve doubt by exploration." Browning's case of recovery after removal of a perforated appendix in the presence of general peritonitis and collapse teaches one not to refuse operation in any case, however desperate, if there is the slightest hope of success.

If we operate, on what day or hour of the disease shall it be done? In the accompanying table are fourteen primary cases that were suppurative or perforative almost from the beginning. A reference to Burnie's, Jacobson's, and Ransohoff's cases of removal during attack, in which there was general suppurative peritonitis on the first and second days of the attack, and to Jacobson's case of incision and drainage in which the pus was shut off from the general cavity of the peritoneum on the one hundred and thirty-seventh day of illness, still further illustrates the fact that a timely operation in one case, so far as hours and days are concerned, may be too late an operation in another.

A study of the appended table seems to show that there is less danger in deferring operation in recurrent than in primary cases. That this would be the case, we are led to believe by *à priori* reasoning because of the adhesions likely to form at each attack. Two facts seem settled: 1. When an operation is to be done, the earlier it is done the better the chances for recovery. 2. The character of the attack and consequent condition of the patient, and not the number of hours or days of illness, should form the basis of decision as to the proper time for operation.

Having decided that operation is advisable, what shall be the nature of it? Here, again, the character of the case and the condition of the patient should form the basis of decision. Where an abscess has formed which may be opened and drained without invading the peritoneal cavity, there is grave reason for doubting the propriety of attempting the removal of the appendix except in those cases where the conditions will permit of its removal without undue prolongation of the operation or danger of tearing the adhesions which shut the pus out of the general peritoneal cavity. I cannot agree with Morton,[1] who says: "In no case should a simple evacuation of pus be considered sufficient, especially if the history of the case presented any account of former appendix trouble." Ransohoff, in a letter to the writer, says: "I have never lost a case of abscess. I do not look for the appendix. If it is in the abscess I remove it. If adhesions are present I let the appendix alone." He has had nine cases of appendicular abscess. This has been my experience in three cases, embraced in the accompanying table, one of them being an extremely unpromising one. This case would have died, I believe, had removal of the appendix been attempted.

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[1] Both occur in annexed table under cases not operated.

The mortality rate of incision and drainage, in the cases here tabulated, is 18.18 per cent., and that of removal of the appendix during attack is 19.7 per cent. This is a decidedly favorable showing for incision and drainage, when we consider the number of cases treated by the latter method, because their desperate condition precludes the idea of any but the simplest operation; together with the fact that all cases treated by incision and drainage are pus cases, which are notoriously unfavorable for excision; and that many of the cases of excision are not pus cases, consequently are favorable cases for excision. The danger of permanent fistulæ or recurrence is urged by some against incision and drainage, but the danger from these sources cannot be compared to that incurred through efforts at removal. Against the more radical(?) operation, and in favor of the simpler one is: the time consumed in the operation; the danger of tearing through adhesions and opening an avenue for infection of the general peritoneum; and, finally, the fact that the removal of the appendix does not positively insure against fistulæ or relapse of inflammation. Referring to the table, it is to be noted that after excision there were in the 151 cases four in which were sinuses remaining unhealed after periods varying from two months to three years, and in one case two relapses, death following the operation for the second relapse.

In the 187 cases of incision and drainage there were seven fistulæ remaining after four months and longer. In those cases with general peritonitis, whether perforative or not, in which the appendix cannot readily be found, or, being found, is so adherent as to make its removal a difficult or prolonged operation, the patient will, because of his depressed condition, be given a better chance for his life by incision cleansing, and drainage with tube or gauze, or both, than by excision—the latter operation being made later if necessary.

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[1] Journal of the American Medical Association, vol. x. p. 734.

Dr. Edward Sonnenburg, an abstract[1] of whose article in the *Sammlung klin. Vorträge*, 1891, No. 13, is to be found in the *Annals of Surgery*, vol. xvi. p. 440, advises operation by two sittings in cases of appendicitis with deeply seated pus. He says: "Experience has shown that by this method it is possible within a few days to again find the deeply seated pus-focus, and then to open it without injuring the peritoneum. Since in this way the operative procedure brings the patient no danger, it will be more readily possible in even doubtful cases to decide for operative treatment, and thus make the treatment more rational." Just how many cases he has operated in this way is not stated, nor is the precise method of operating given in the abstract—the original I have not seen. The greatest objection to this method of operating is, perhaps, that while we are waiting for adhesions to form after the first sitting before completing the operation, the abscess may burst or the patient become septic. Yet if, as Sonnenburg says, this "procedure brings the patient no danger," might it not be commenced so much earlier than the usual operation as to rob this objection of its force? The probability of its being a safe method of treating a class of cases which, with methods now in general use, has given us a frightful mortality, is strong enough to warrant a trial of it.

What shall be the method of operating for removal of the appendix? Where there is a tumor this is often taken as the guide for the incision. In the absence of tumor the majority seem to favor incision in the right semilunaris and the wisdom of this choice is proven not only by the operations thus made, but also by the results of Bryant's[2] investigations of the anatomy of the appendix. In his table concerning the location and direction of the appendix, we find it inward in 34, behind the cæcum in 32, downward and inward in 28, and into the true pelvis in 21, in a total of 144 cases. Either of these locations is accessible through this incision. Trendelenburg's posture, allowing, as it does, the pus to run out if present, and the operator to see the parts he is operating upon, renders comparatively easy and safe what in any other position would be a difficult and dangerous operation.

The complete and permanent recovery of the patient after removal of the appendix depends in no small measure upon the treatment of the stump. The ideal method seems to be that in which the stump, after ligation, is turned into the cæcum and buried by Lembert sutures, as described by Senn in his article referred to above, and described and illustrated by Morris in the *New England Medical Monthly*, April, 1893, p. 331. Indeed, I am convinced, by a careful study of all the literature upon this point accessible to me, that unless the stump be thus treated or in some way be covered by peritoneum after ligation, the removal of the appendix leaves the patient in great danger of perforation. One of the cases (Browning's) in the accompanying table might be chosen from among a number as a reference to emphasize this statement.

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[1] William Browning (Brooklyn).

[2] Annals of Surgery, February, 1893.

Care should be used in closing the wound in the abdominal wall to secure against ventral hernia. Whether or not the danger of hernia is less after stitching the several layers of tissue separately, than it is after stitches carefully applied in the ordinary way, I have been unable to satisfy myself from the material at my command.

Whole number of cases		448	
" " " recoveries		371	
" " " deaths		77	
Average mortality rate			17.23 per ct.
Removal of appendix during attack	Recovered	122	= 80.3 per ct.
	Died	29	= 19.7 "
		151	
Removal of appendix during quiescence	Recovered	13	= 92.86 "
	Died	1	= 7.14 "
		14	
Incision and drainage	Recovered	154	= 81.82 "
	Died	34	= 18.18 "
		188	
Appendicitis—no operation	Recovered	82	= 86.32 "
	Died	13	= 13.68 "
		95	

ON THE OCCURRENCE OF A FORM OF CHRONIC BRIGHT'S DISEASE, OTHER THAN TYPICAL FIBROID KIDNEY, WITHOUT ALBUMINURIA.[1]

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Since Bright first directed attention to the relationship existing between albuminuria and diseases of the kidney, the presence in the urine of serum-albumin in quantity detectable by time-honored tests has properly been accepted to indicate renal derangement. So necessary is this association generally regarded that many otherwise acute clinicians, in pinning faith to the presence of albumin as an infallible guide to the recognition of nephritis, are not infrequently led into the error of inter-

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[1] Read before the Pan-American Medical Congress, Washington, September, 1893.